



A Human Capital Effect on Economic Growth: A Case Study of Korea

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ARTICLE DETAILS	ABSTRACT
History Revised format: May, 2020 Available Online: Jun, 2020 Keywords Human Capital; Economic Growth; Republic of Korea; Ordinary Least Square (OLS) Method.	Present study examined the impact of human capital on economic growth in Korea. The annual time series data used from 1985 to 2018. In this research, the study applied Ordinary Least Square (OLS) method to estimate the impact of human capital on economic growth. The results show that there is a positive and significant impact of human capital on economic growth in Korea. Furthermore, Foreign direct investment and domestic investment both have a positive and significant impact on economic growth. Similarly, Labor force participation rate, saving and Trade are positively related to economic growth in Korea. The interaction effect of FDI*HC, DI*HC and HC*Trade show that human capital strengthen the impact of investment and trade on economic growth in Korea. The findings suggest that greater the investment on human capital and technology improves the productivity and economic growth in Korea.

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1. Introduction

Economic theory emphasize that human capital is important determinant of national income. Accumulation of human capital, Domestic investment, Labor Force and economic development for human welfare are the indicators of economic policy of each country. GDP is a representation of the total output of goods and services for an economy. Human capital and economic growth both have great correlation. The economy is the composite system of human economic activity involved in the consumption, production, exchange and distribution of goods and services. The economic growth is dependent upon the economic factors of production along with management of its human resources. Human Capital is actively engaged in meaningful, worthy work and providing some level of desired productivity. Human capital act is the act of increasing the productivity qualities of labor force by providing more education and by increasing skill, health and nutrition level. If the people of a country are well educated, well nourished, skilled and healthy that will be said to have more human capital which leads to increase in economic growth. The rich and developed countries greatly invest in education rather than poor and developing countries. Because the developed countries have more financial resources to invest in accumulation of human capital in order to capture more gains from world level (Heyneman, 1999; Elu, 2000 and Oketch 2000, 2002). The education system in a country is influenced by its socio-economic setup and political stability. Investment in

human capital being effective when educated labor force is optimal utilized to speed up the economic activities through public policies. In this research study, the novelty is the moderating role of human capital with trade, human capital with foreign direct investment and human capital with domestic investment on the economic growth of Korea. The research work has covered the Republic of Korea in the reference of base article from Pakistan.

2. Literature Review

Khalil and Hafeez (2019), investigate the effect of human capital on the economic growth of developed and developing economies of East, West and South Asia in the presence of corruption. The result finds out that Human Capital and Gross Capital Formation positively affect the economic growth. On the other hand, democracy has mixed effect and population growth rate slow down the economic growth of developing countries. Han and lee (2019), highlighted a study of human capital on labor composition of gender, age, education, and wage rate and its role in growth for the Korean economy. Dramatic rise in human capital in last 30 years has grown gradually at about 1% per year, contrasting to a continuously declining trend of total work hours. This growth has been taken by the rise of better-educated baby boom cohorts. A growth accounting results showed that human capital contributed magnificently to economic growth and has acted as a major growth determinant to increase the employment rate of workers. Mudassar and Rehman (2019), investigated the human capital and economic growth nexus in the presence of corruption for developed and developing economies and East, West, and South Asia. Findings of Dynamic Panel Data and the Generalized Method of Moments showed that human capital has positive impact on economic growth despite of the fact that corruption has stimulated growth while at the same time it has suppressed the growth process as well. Results are quite consistent with Solow model that population growth rate also has negative impact on economic growth for all economies, but democracy has mixed effects for the groups of the economies. Ali et al (2018), found out that human capital has positive impact on economic growth but this relationship ought not to be exist for some reasons as well. Empirical findings for 132 countries over 15 years showed that human capital played a positive role in per capita growth with the sole presence of better economic opportunities and high-quality legal institutions. Economic opportunities proved to be the driving force of human capital thus leaving an impact on growth by making business and trade easier domestically as well as on international level. Afridi (2016), focused on human capital and economic growth in Pakistan. This study showed positive relationship between human capital and economic growth in Pakistan. The study also conclude that physical capital and birth rate have positive impact on the economic growth. Jihene (2013), investigate the impact of human capital on GDP of Tunisia, Morocco, Japan and South Korea. The study used GDP per capita as dependent and Gross Capital Formation, Trade Openness and Higher Education as independent variables. This result illustrates high level of GDP and human capital of those countries. Chani et al (2012), conducted an empirical analysis of human capital formation and economic development in Pakistan. The variable investigated to check the responsiveness of economic development in case of Pakistan are investment in human capital, investment in physical capital and labor force. The findings showed that there is a positive relationship of economic development with investment in physical and human capital and labor force. The study suggested that government can increase output by investing in education and health of people and can also increase output by provide training to the labor.

Khan (2011), investigated on factors that explain Pakistan's relative growth performance. In addition to determine growth, the role of differences in the quality of human capital has been observed. Empirical estimations suggested that accumulation of both kinds of capital i.e physical capital and advancement in the quality of educational institutions which is human capital have brought dynamic returns in terms of attaining higher growth rates. So it can be concluded that better education and health have a notable and positive impact on GDP growth and further investment in these sectors will raise the chances of Pakistan entering a virtuous cycle of higher growth. Cervellati and Sunde (2011), enquired a causal association between life expectancy and income per capita growth. Demographic transition in terms of population dynamics played an indispensable role for the transition from stagnation to growth. Results of empirical analysis provided a new interpretation of the contradictory between existing and evidence. The results show that increases in life expectancy generated income per capita in countries that had already experienced the onset of the transition by 1940. The effect was opposite in pre-transitional countries but sometimes statistically insignificant. In correspondence with the theoretical predictions, these patterns are complemented by statistically significant opposite effects on population growth. Maksymenko and Rabbani (2009), analyzed the impact of economic reforms and human capital on the economic growth of India and South Korea in the post-reform period. The study recommended that economic reforms and human capital accumulation produced a significant long-run effect on economic growth in both countries. The study showed vital positive effect of human capital increased labor exposed both in India and South Korea in the twelve-year post-reform period. The outcome was positive and large in South Korea, although it is negative and small in India. Abbas and Peck (2008), explored the association between human capital and economic growth in Pakistan with comprehensive range of time series data. Results estimations by using Johaneson technique revealed a dynamic role of human capital in order to enhance economy. Rate of return from secondary schooling human capital in Pakistan was observed to be much more compared to OECD nations thus having a positive impact on growth rates. Levin and Raut (1997), examined the determinants of growth by using a panel of 30 semi-industrialized developing nations. Empirical estimations provided strong and robust evidence that a high degree of complementarity between trade policies and education expenditures found has been and presented new support to the export orientation which contributed to growth by increasing returns to scale and other productivity differentials. This sensitivity was due to an interaction between average education and export orientation, which has been neglected by previous studies. Furthermore, we found that growth in the manufactured exports to GDP ratio had a strong impact on growth, whereas growth in the ratio of primary commodity exports to GDP presented minor influence, thus indicating that increasing returns and other efficiencies were mainly present within the manufactured export sector only. These findings were quite consistent with the development policies that stimulated and maintained long-run economic growth rates.

3. Data and Methodology

The research study focused on secondary type and time series data. To find the relationship between dependent variable and independent variable in Korea, the study used annual data from 1985 to 2018. The data is collected from various sources such as official website of central bank of Korea, world development indicators (WDI), various handbooks of statistics and various economic survey Korea. In statistics, ordinary least squares (OLS) is a type of linear least squares method for estimating the unknown parameters in a linear regression model. OLS chooses the parameters of a linear function of a set of explanatory variables by the principle of least squares:

minimizing the sum of the squares of the differences between the observed dependent variable (values of the variable being observed) in the given dataset and those predicted by the linear function.

$$GDP = f(HC, FDI, DI, LFPR, SAV, Trade) \text{ Econometric}$$

Model of the study is:

$$GDP = \beta_0 + \beta_1 HC_t + \beta_2 FDI_t + \beta_3 DI_t + \beta_4 LFPR_t + \beta_5 SAV_t + \beta_6 Trade_t + \mu_t$$

4. Results and Discussion

In this present study the empirical data analysis is performed. For this purpose, it is necessary to take an overview of some basic properties of dependent and independent variables.

Descriptive Statistics Table:

	FDI		DI		HC		SAV		GDP
			LFPR		TRADE				
Mean	748265.4	6596.641	234428.3	96.30335	61.13088	138936.9	70.98178		
Median	603559.6	6766.15	211024	96.33614	61.45	118511	65.92913		
Maximum	1619424	17912.9	486720.9	100.8121	63.4787	561501.3	110.0001		
Minimum	100273.1	233.5	29758.63	90.08706	56.595	21827.48	47.5874		
Std. Dev.	452782.7	5117.266	131193.4	2.855368	1.606373	95526.18	18.50801		
Skewness	0.34171	0.252299	0.23202	-0.18529	-1.1593	2.593541	0.662647		
Kurtosis	<u>1.874855</u>	<u>1.890418</u>	<u>1.989467</u>	<u>2.251379</u>	<u>4.283574</u>	<u>12.32415</u>	<u>2.345909</u>		

The summary of Descriptive Statistics of selected variables is given in Table 5.1. The first row shows the average of GDP is (748265.4) respectively, in percentage. The mean value of FDI, DI, HC, LFPR, Sav and Trade are (6596.641), (234428.3), (96.30335), (61.13088), (138936.9) and (70.98178). The skewness values are given in second last row of Table. Skewness in statistics informs an imbalance and asymmetry from the mean of a data distribution. If we say that data distribution is skewed, the mean is directly in the middle (and top point) of the bell curve and the mean, median and mode are same. In a normal data distribution and perfectly symmetrical bell curve, the median and mean are always the same value. Here we see that human capital and labor force participation rate is negatively skewed. All other variables like GDP, FDI, DI, SAV and Trade are positively skewed because mean values of these variables are greater than their median values. Last row of the table shows the values of kurtosis. In statistics, kurtosis is used to measure flatness or peakedness of data set relative to normal distribution. Kurtosis value of normal distribution is equal to 3. If the kurtosis value is greater than 3, it means probability distribution is highly peaked and known as Leptokurtic. If the value of kurtosis is less than 3, it means probability distribution shows flatness of data and it is known as Platykurtic. In our analysis of Descriptive Statistics GDP, FDI, DI, HC and Trade have kurtosis value less than 3, so these are the platykurtic and other variable LFPR and SAV are Leptokurtic.

Correlation Table:

	FDI	DI	HC	LFPR	SAV	TRADE
FDI	1.000000					
DI	0.781911	1.000000				
HC	0.576204	0.767007	1.000000			
LFPR	0.598190	0.790057	0.816071	1.000000		
SAV	0.633363	0.840323	0.664633	0.670206	1.000000	
TRADE	0.696233	0.750886	0.451882	0.331532	0.509697	1.000000

Correlation table shows the correlation matrix of all variables included in this study. The pair-wise correlation is presented in correlation matrix. It shows that FDI is correlated with DI, HC, LFPR, SAV and Trade about (0.781911), (0.576204), (0.598190), (0.633363) and (0.696233) points which shows less correlation and ER.

Ordinary Least Square Results Table:

Estimate Long Run Results Using OLS Methods				
Dependent Variable: Log of GDP				
33 Observations Used for Estimation from 1985-2018				
Variables	Coefficient	Std. Error	t-Statistics	Prob.
FDI	0.047781	0.006581	7.260807	0.0000
DI	0.766318	0.017172	44.62709	0.0000
HC	0.179754	0.164755	1.091042	0.0857
LFPR	1.081932	0.629197	1.719545	0.0979
SAV	0.051922	0.024512	2.118187	0.0443
Trade	0.309554	0.053087	5.831068	0.0000
HC*FDI	0.354153	0.082006	4.318646	0.0002
HC*DI	3.181573	0.573046	10.24726	0.0000
HC*Trade	0.65237	0.233823	2.790019	0.0099
R-squared	0.995888		F-statistic	864.8755

Adjusted R-squared	0.994736	Prob. (F-statistic)	0.0000
Durbin-Watson Test		1.231923	

In above table, the value of coefficient of foreign direct investment (FDI) shows that there is positive and significant relationship with dependent variable gross domestic product (GDP). Empirical result shows that in the long run, one-unit increase in trade openness induced (0.047781) unit increase in economic growth. My study also supports the findings of Nilofer and Qayyum (2018). Domestic Investment is positive and statistically significance with the GDP. If one-unit increase in labor force participation rate it will bring (0.766318) unit increase in gross domestic product. Findings support the study of Ali et al (2012). The value of coefficient of Human Capital (HC) is also shows positive and insignificant relationship with the dependent variable GDP. If there is one-unit increase in capital investment, it will bring (0.179754) unit increase in GDP. Study also supports the findings of Maksymenko and Rabbani (2011). The value of coefficient of labor force participation rate (LFPR) also shows the positive and insignificant relationship with the dependent variable GDP. The results showed that, if there is one-unit increase in labour force it will bring (1.081932) unit increase in economic growth. This study hardly supports the findings of Shahid (2014). Saving is positive and statistically significance with the GDP. If one-unit increase in saving it will bring (0.051922) unit increase in gross domestic product. Study also supports the findings of Sothan (2014). The value of coefficient of Trade also shows positive and significant relationship with the dependent variable GDP. If there is one-unit increase in trade, it will bring (0.309554) unit increase in GDP. Study also supports the findings of Obadan and Elizabeth (2010). Human capital and foreign direct investment is positive impact on GDP. The combined effect of human capital and foreign direct investment are also positive on GDP, if one-unit increase in saving it will bring (0.354153) unit increase in gross domestic product. Domestic investment and human capital is positive effect on GDP. The interaction term of human capital and domestic investment has positive impact on GDP, if one-unit increase in domestic investment, it will bring (3.181573) unit increase in gross domestic product. Human capital and trade is positive impact on GDP. The combined effect of both variables has positive on GDP, if one-unit increase in trade it will bring (0.65237) unit increase in gross domestic product. All the values of coefficients show positive impact on macroeconomic stability in Korea.

Breusch-Godfrey Serial Correlation LM Test

F-statistic	5.848054
Prob.	0.0045

The autocorrelation problem is tackled by HEC model, this test is combined approximate heteroskedasticity and serial correlation.

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.589689
Prob.	0.7375

The Breusch-Pagan-Godfrey shows that probability value of greater than 5% so there is no heteroskedasticity in the data. Null hypothesis accepted and Alternative hypothesis rejected.

5. Conclusion

The main objective of present study is to investigate the impact of human capital on economic growth of Korea. The study also analyzed that how human capital changes improve the economic growth. The study used annual time series data from 1985 to 2018. The present study reviews various literature which are related to human capital and economic growth. Through the previous literature reviews, the study investigated the positive relationship between human capital and economic growth. The study also throws light on Endogenous Growth Theory which shows the impact of human capital changes to improve country economy and performance of economy. Firstly, the study finds the result of descriptive statistics. Secondly, the present study analyses correlation results which show that human capital, domestic investment, labor force participation rate, foreign direct investment, saving and trade correlated. In the next step, the present study applies Ordinary Least Square (OLS) method to co-integration and to find the relationship between dependent variable and independent variables. The findings show that human capital and interaction term of HC*FDI, HC*DI and HC*Trade changes put positive and significant impact on economic growth of Korea. The findings suggest that human capital invest on low skilled labor to improve the productivity and economic growth.

REFERENCES

- Acevedo, S. (2008). Measuring the impact of human capital on the economic growth of South Korea. *Korea and the World Economy*, 9(1), 113-139.
- Abbas, Q., & Foreman-Peck, J. S. (2008). Human capital and economic growth: Pakistan 1960-2003. *Lahore Journal of Economics*, 13(1), 1-27.
- Ali, S., Scholar, M. P., Chaudhry, I. S., & Farooq, F. (2011). *Human capital formation and economic growth in Pakistan* (Doctoral dissertation, Doctoral dissertation, BAHAUDDIN ZAKARIYA UNIVERSITY, MULTAN).
- Afridi, A. H. (2016). Human capital and economic growth of Pakistan. *Business & Economic Review*, 8(1), 7786.
- Ali, M., Egbeokun, A., & Memon, M. H. (2018). Human capital, social capabilities and economic growth. *Economies*, 6(1), 2.
- Borensztein, E., De Gregorio, J., & Lee, J. W. (1998). How does foreign direct investment affect economic growth? *Journal of international Economics*, 45(1), 115-135.
- Chani, M. I., Shahid, M., & Ul, H. M. (2012). Some socio-economic determinants of fertility in Pakistan: an empirical analysis. *Актуальні проблеми економіки*, (5), 477-484.
- Heckman, J. J., & Yi, J. (2012). *Human capital, economic growth, and inequality in China* (No. w18100). National Bureau of Economic Research.
- Han, J. S., & Lee, J. W. (2020). Demographic change, human capital, and economic growth in Korea. *Japan and the World Economy*, 53, 100984.

- Jihène, S. (2013). The Impact of Human Capital on Economic growth: Case of Tunisia, Morocco, Japan and South Korea. *Economic, Finance and Management Outlook, Conscientia Beam*, 1, 1-2.
- Khan, M. S., Amjad, R., & Din, M. U. (2005). Human capital and economic growth in Pakistan [with comments]. *The Pakistan development review*, 455-478.
- Lee, M. L., Liu, B. C., & Wang, P. (1994). Education, human capital enhancement and economic development: Comparison between Korea and Taiwan. *Economics of Education Review*, 13(4), 275-288.
- Lee, J. W. (2005). Human capital and productivity for Korea's sustained economic growth. *Journal of Asian Economics*, 16(4), 663-687.
- Maksymenko, S. V., & Rabbani, M. (2008). Economic reforms, human capital, and economic growth in India and South Korea: a cointegration analysis. *Human Capital, and Economic Growth in India and South Korea: A Cointegration Analysis (August 1, 2008)*.
- Mudassar, K. (2019). Human capital and economic growth nexus: Does corruption matter? *Pakistan Journal of Commerce and Social Sciences (PJCSS)*, 13(2), 409-418.
- Nilofer, N., & Qayyum, A. (2018). Impact of Foreign Direct Investment on Growth in Pakistan: The ARDL Approach.
- Obadan, M. I., & Okojie, E. I. (2010). An empirical analysis of the impact of trade on economic growth in Nigeria.
- Romer, P. M. (1994). The origins of endogenous growth. *Journal of Economic perspectives*, 8(1), 3-22.
- Shahid, M. (2014). Impact of labour force participation on economic growth in Pakistan. *Journal of Economics and Sustainable Development*, 5(11), 89-93.
- Sothan, S. (2014). Causal relationship between domestic saving and economic growth: Evidence from Cambodia. *International Journal of Economics and Finance*, 6(9), 213.
- Shaimerdenova, A., & Garcia-Zamor, J. C. (2017). Influence of human capital on economic growth: A comparative analysis of education development in Kazakhstan, South Korea, Singapore and Malaysia. *Journal of Public Administration and Governance*, 7(3), 30-46.